

**HEPARİN - PROTAMİN
NÖTRALİZASYONUNDA YAPILAN HATALAR
POC VE KONVANSİYONEL TESTLER
NASIL KULLANILMALI?**

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Anesteziyoloji ve Reanimasyon Kliniği

SUNUM AKIŞI

- Heparin ve problemler
- Protamin ve problemler
- ACT ve problemler
- Protamin yönetim stratejileri
- POC ve konvansiyonel takip parametreleri
- Son söz

Heparin

KPB sırasında ve sonunda, heparinin uygulanan dozu ile plazma seviyesi arasındaki ilişki değişken

- Heterojen
- zinciri molekülün 1/3'ünde
- Eliminasyon özellikleri;
Organ disfonksiyonları (renal)
Makrofajlar, plazma proteinleri
- KPB'da
Hemodilüsyon, hipotermi

PROTAMİN

Heparin neutralisation 1:1

Dissoiation ATII-heparin complex

Activation of platelets, reduced thrombin generation, INHIBITION GPIIb/IIIa activity

Reduced platelet function

Enhanced fibrinolysis

Reduced dot strength and thrombin generation and shortened time to lysis

Inhibition of coagulation

Reduced thrombin generation, factor V and VIII activation and factor VIII clotting activity

Boer et al. BJA, 2018

Protamine Overdose and Its Impact on Coagulation, Bleeding, and Transfusions After Cardiopulmonary Bypass: Results of a Randomized Double-Blind Controlled Pilot Study

PR Kullanılan heparin miktarına göre yapılan protamin yönetimi, yüksek protamin dozlarına ve buna bağlı hemostazın bozulmasına sebep olur

Gr

PROTAMİN DOZUNDA HEDEF, SİRKÜLASYONDAKİ HEPARİN MİKTARI KADAR OLMALIDIR

	P Value
	.29
	.81
	.23
	.39
	>.999
	<.001
	amine
	.008
	.01
	.013
	.045
▪ Kanama/kan ürünü kullanımı	

	CFT INTEM, sec	117 (103-170)	98 (78-131)
▪	MCF INTEM, mm	57 (53-63)	55 (51-60)
▪	MCF FIBTEM, mm	13 (10-15)	9 (7-14)

The effect of protamine dosing variation on bleeding and transfusion after heparinisation for cardiopulmonary bypass

Stephen A. Kunz,^{1,2} Lachlan F Miles,³ Damian

**PROTAMİN/HEPARİN
Total Heparin dozuna göre
L <0.6 / M 0.6-1 / H >1
Protamin/Heparin ↑
▪ Kanama ve kan transfüzyonu ↑
▪ Re-operasyon ↑**

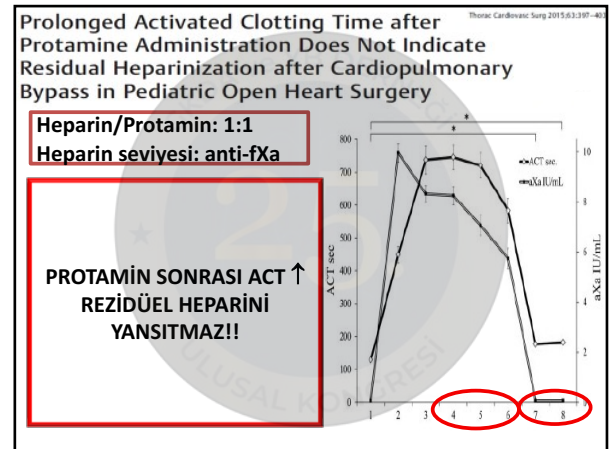
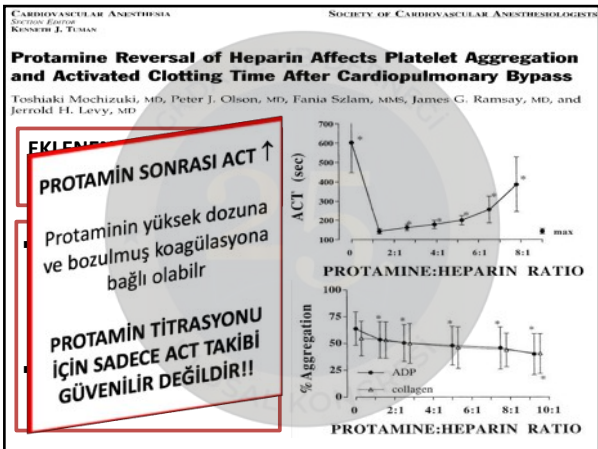
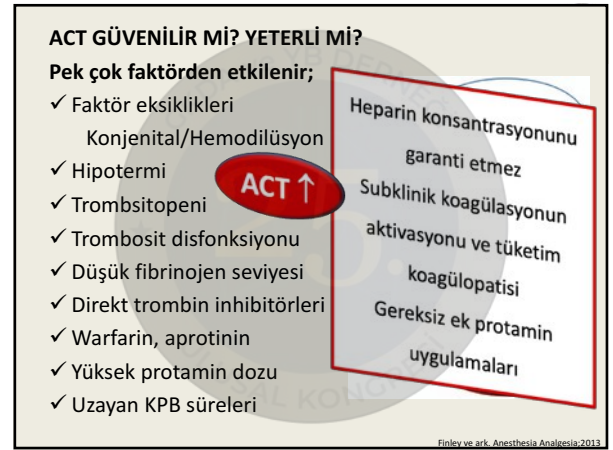
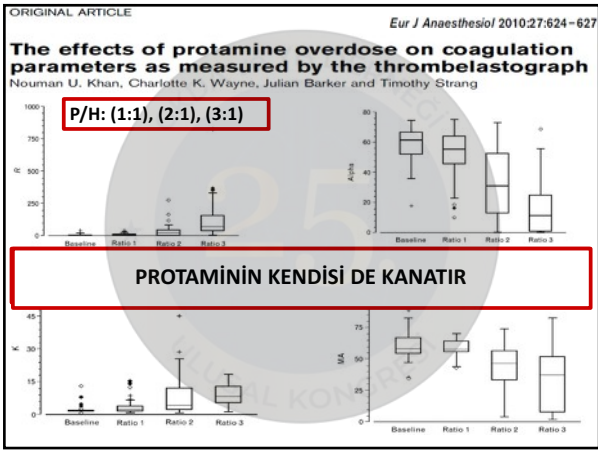
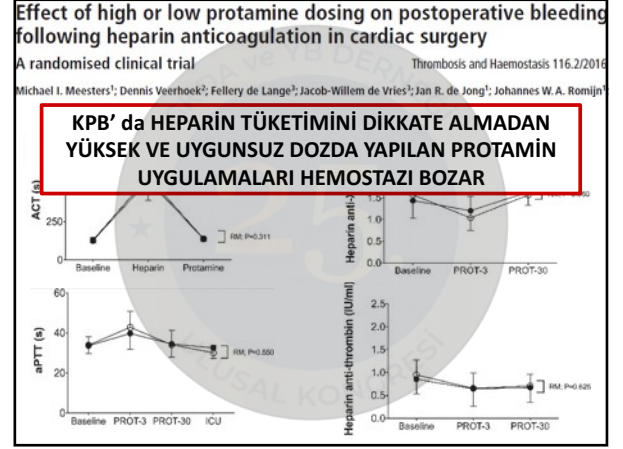
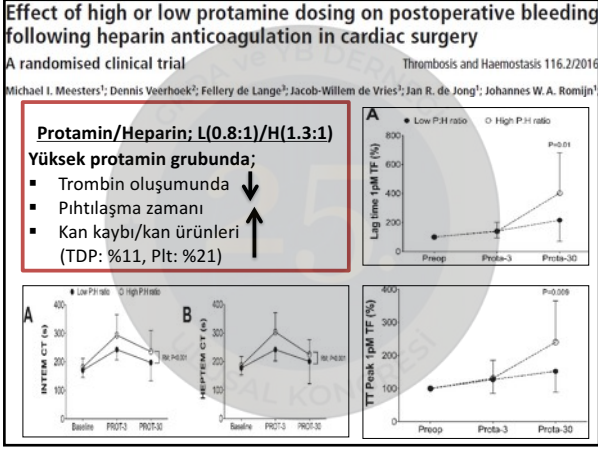
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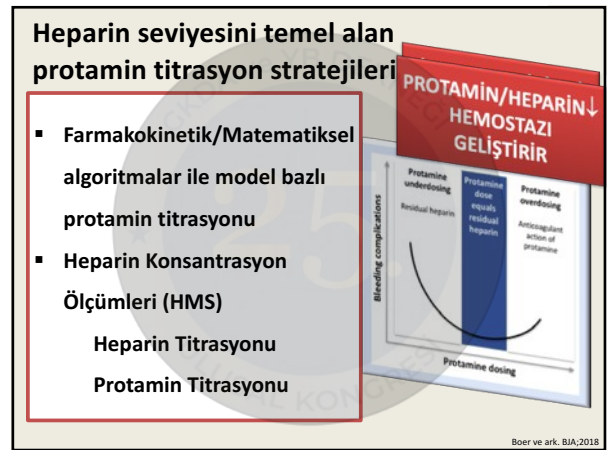
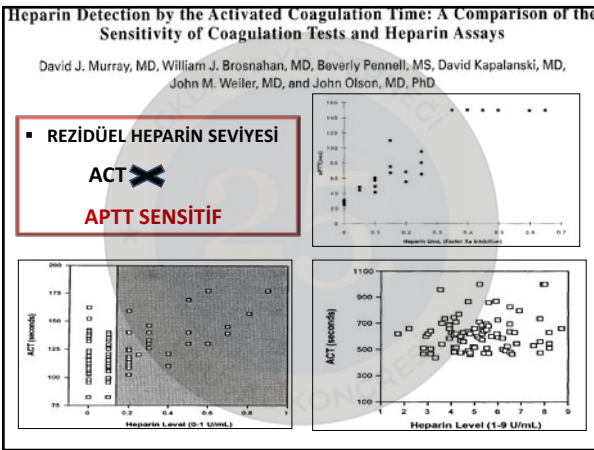
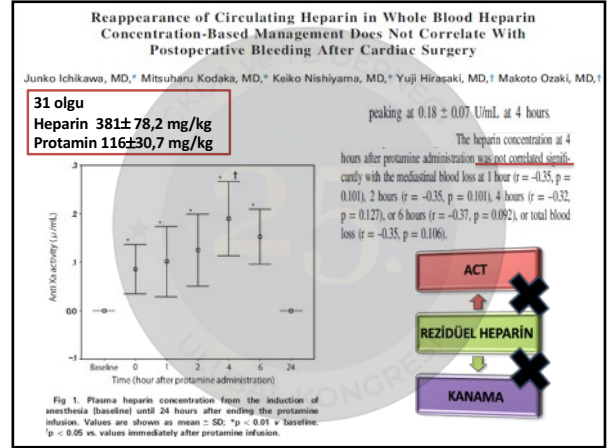
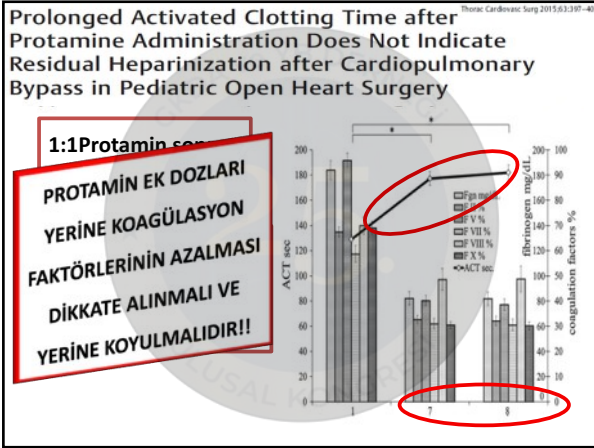
0.0100
0.0001
0.0001

Protamine-heparin category

Protamine-heparin Ratio

Protamine-heparin category





Individualized Heparin and Protamine Management Improves Rotational Thromboelastometric Parameters and Postoperative Hemostasis in Valve Surgery

Alexander B.A. Vonk, MD,* Dennis Veerhoek, CCP,* Charissa E. van den Brom, PhD,† Laurentius J.M. van Barneveld, CCP,* and Christa Boer, PhD†

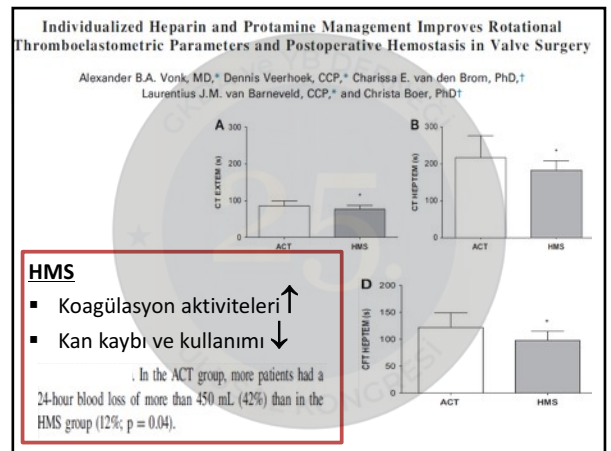
Heparin/Protamin Yönetimi ACT/HMS

HMS

- Bolus ve total heparin dozu
- Total protamin dozu
- Protamin-heparin oranı
- Protamin sonrası ACT

Table 3. Heparin and Protamine Management and ACT Values

	ACT	HMS	p value
Initial heparin bolus (mg)	225 \pm 40	292 \pm 65	<0.001
Weight-corrected heparin bolus (mg/kg)	3.02 \pm 0.04	3.66 \pm 0.61	<0.001
Heparin during CPB (mg)	134 \pm 87	149 \pm 55	0.54
Total heparin dose (mg)	377 \pm 105	446 \pm 102	0.05
Total protamine dose (mg)	377 \pm 105	269 \pm 62	<0.001
Protamine-to-heparin ratio	1.00 (1.00-1.00)	0.62 (0.56 - 0.66)	<0.001
Preoperative ACT (s)	130 \pm 14	127 \pm 11	0.40
ACT after heparin administration (s)	482 \pm 67	500 \pm 87	0.76
ACT after protamine (s)	134 \pm 13	129 \pm 16	0.35
Target ACT reached (n)	58%	53%	0.52



Contents lists available at ScienceDirect

Protamin Yönetimi

- Heparin seviyesi kılavuzluğu
- Hedefe yönelik bireyselleştirilmiş uygulama
- Dozu azalt -Protamin/Heparin doz oranı < 1:1
 - Kanama ve transfüzyonu azaltmak amacıyla protaminin, heparin düzeyi kılavuzluğunda uygulanması düşünülebilir (**Iİb-B**)
- Protamin/heparin doz oranı <1:1 uygulanmalı (**Iİa-B**)



Contents lists available at ScienceDirect

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Journal homepage: www.elsevier.com

2017 EACTS/EACTA Guidelines on patient blood management for adult cardiac surgery

KANAMA NEDENLERİ POC VE KONVANSİYONEL TESTLER İLE BELİRLENEREK ERKEN VE HEDEFE YÖNELİK YAKLAŞIM UYGULANMALI

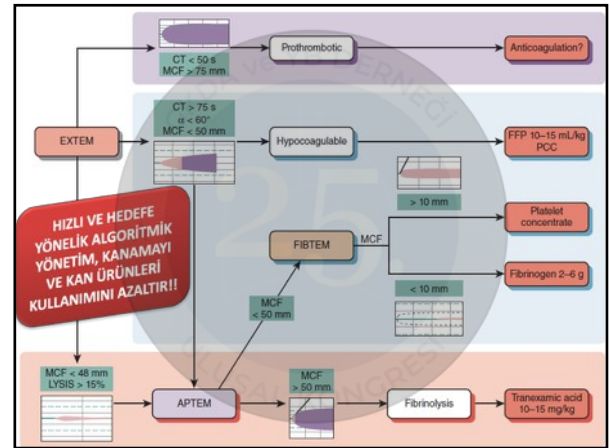
EJA

Eur J Anaesthesiol 2017; 34:332–395

GUIDELINES

Management of severe perioperative bleeding: guidelines from the European Society of Anaesthesiology

First update 2016



KONVANSİYONEL TESTLER

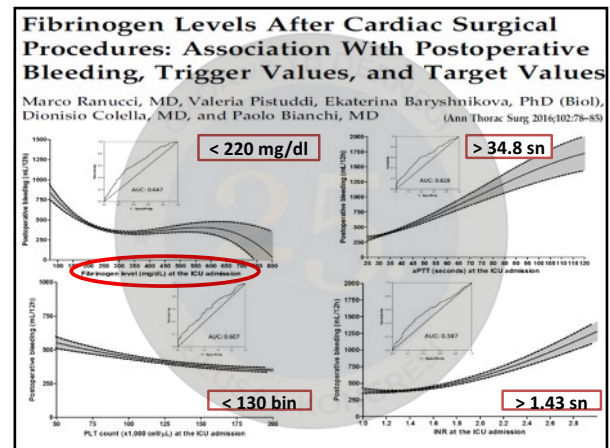
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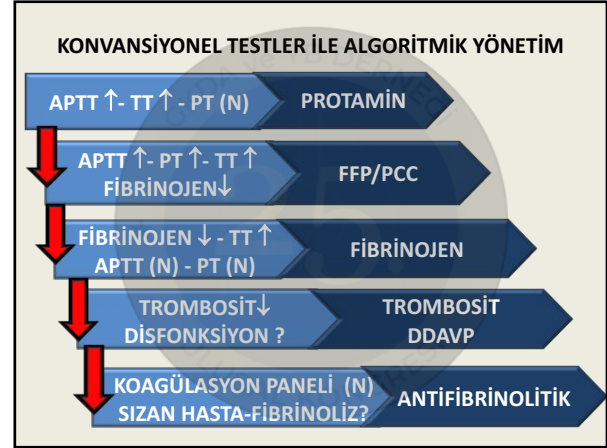
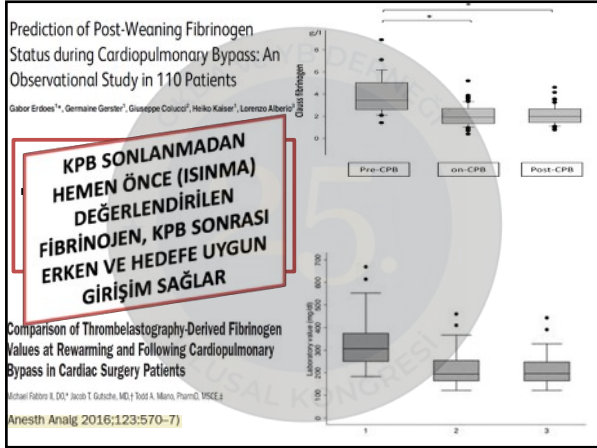
PT/INR

TT

TROMBOSİT

FİBRİNOJEN





Prokoagülan girişimler

- Antifibrinolitikler (TXA, aprotinin, EACA) kanamayı, transfüzyonu azaltmak amacıyla önerilir **(I-A)**
- Fibrinojen <1.5g/l ise postoperatif kanama/transfüzyonu azaltmak düşünülebilir **(IIb-B)**
- Proflaktik Fibrinojen ve FFP önerilmez **(III-B)**
- PCC veya FFP faktör eksikliği ile ilişkili kanamalarda **(IIa-B)**, VKA kullanımında düşünülebilir **(IIb-B)**

SON SÖZ

Heparin ve protamin kullanım gerekliliği KPB altın standart olarak devam etmektedir

Bireyselleştirilmiş hedefe yönelik heparin/protamin uygulamaları kalp cerrahisinde hasta kan yönetiminin önemli bir parçasıdır

POC ve konvansiyonel takip parametreleri ayırt edici özellikleri ile hedefe yönelik uygulamalar sağlayarak kanama ve kan ürünleri kullanımını azaltır

